

What is claimed is:

1. A method for forming an extended solder column on a contact pad of an electronic device, comprising steps of:

(a) applying a solder seed to the contact pad;

6 (b) contacting the seed with a surface substantially parallel to and opposite the contact pad, with the seed between the surface and the pad;

(c) melting the seed to wet the contact pad and the surface;

(d) extending the relative separation of the surface and the contact pad, drawing the molten seed into a column; and

(e) solidifying the resultant column.

12

2. The method of claim 1 comprising multiple contact pads on the electronic device and multiple surfaces, one for each contact pad.

3. The method of claim 1 wherein the surface is a second contact pad of a second electronic device, such that, after step (e) the column forms an electrical contact path between the two contact pads.

18

4. The method of claim 2 wherein the surfaces are second contact pads of a second electronic device, such that, after step (e), the columns form electronic contact paths between the associated contact pads.

24 5. The method of claim 2 comprising a further step (f) for breaking the bond at the surface to leave extended solder columns metallurgically bonded to the contact pads.

6. The method of claim 5 wherein the bonds to the surfaces are broken by heating the surface.

30

7. An integrated circuit (IC) assembly for mounting to a surface of a device board comprising:

6 a plurality of planar ICs each having first contact pads on one surface, which connect to electronic devices in the IC, and conductive columns metallurgically bonded to and extending from individual ones of the contact pads;

12 a plurality of planar interposers parallel to and interspersed with the plurality of planar ICs, each interposer having second contact pads on at least one surface connected to the conductive columns, and traces on at least one surface connected to the second contact pads, individual ones of the traces leading to electrical contact regions on an edge at a periphery of the individual interposer, the contact regions facing away from the interposer in a direction parallel with the one surface; and

18 a plurality of conductive bars extending in a direction orthogonal to the planar ICs and interposers, the conductive bars metallurgically bonded to individual ones of the outward-facing peripheral contact regions, the bars constraining the interspersed interposers and ICs into a closely-spaced stack and providing common signal paths from the stacked ICs.

8. The assembly of claim 7 wherein the conductive bars end on one side at a plane away from one end of the stacked ICs, and are connected to an intermediary board having traces and third contact pads for connecting the IC stack to a printed circuit board (PCB).

24 9. The assembly of claim 7, wherein the ICs are memory chips and the PCB is a memory board.

30 10. The assembly of claim 7, further comprising a polymer material imposed between interspersed interposers and planar ICs, the polymer layer providing additional support for the stack and the conductive columns.

11. A memory module for providing memory resources to a computerized appliance comprising:

a printed circuit board (PCB) having at least one location for mounting an IC assembly; and

an integrated circuit (IC) assembly mounted to the PCB, the assembly comprising a plurality of planar ICs each having first contact pads on one surface, which connect to electronic devices in the IC, and conductive columns metallurgically bonded to and extending from individual ones of the contact pads, a plurality of planar interposers parallel to and interspersed with the plurality of planar ICs, each interposer having second contact pads on at least one surface connected to the conductive columns, and traces on at least one surface connected to the second contact pads, individual ones of the traces leading to electrical contact regions on an edge at a periphery of the individual interposer, the contact regions facing away from the interposer in a direction parallel with the one surface, and a plurality of conductive bars extending in a direction orthogonal to the planar ICs and interposers, the conductive bars metallurgically bonded to individual ones of the outward-facing peripheral contact regions, the bars constraining the interspersed interposers and ICs into a closely-spaced stack and providing common signal paths from the stacked ICs.

12. The memory module of claim 11, comprising a plurality of IC packages mounted to both sides of the circuit board of the module.

13. An interposer for providing conductive and nonconductive interface between opposing leads of ICs stacked in a packaged IC assembly comprising:

a non-conductive sheet;

metal contact pads and traces formed on the non-conductive sheet, including openings through the non-conductive sheet to expose regions of conductive contact pads or traces; and

contact regions implemented at a periphery of the non-conductive sheet, connected to traces on the sheet, and facing outward in a direction parallel with the sheet.

6 14. The interposer of claim 13, wherein the conductive traces and contact pads are formed from a copper foil applied to the non-conductive sheet by an adhesive.

12 15. The interposing contact element of claim 14, wherein the metal contact pads and traces are formed in a metallic film layer deposited on the interfacing material using one of a deposition, spin-on, or sputtering technology.

16. The interposer of claim 13, wherein the non-conductive sheet is formed from a BT resin.

18 17. The interposer of claim 13 wherein the contact regions are formed by filling holes along a periphery of the non-conductive sheet with solder, then trimming the sheet through the solder-filled holes.

18. An integrated circuit (IC) assembly for mounting to a surface of a device board comprising:

24 a plurality of planar ICs each having first contact pads on one surface, which connect to electronic devices in the IC, and conductive columns metallurgically bonded to and extending from individual ones of the contact pads;

30 an interposer formed of a length of foldable non-conductive material, folded to progressively space apart adjacent ones of the planar ICs in order, the folded interposer having second contact pads on at least one surface connected to the conductive columns of the plurality of ICs, and traces on at least one surface connected to the second contact pads, individual ones of the

traces leading to electrical contact regions on the foldable interposer such that the contact regions face away from the assembly in a direction parallel with the plane of the ICs; and

- 6 a plurality of conductive bars extending in a direction orthogonal to the planar ICs, the conductive bars metallurgically bonded to individual ones of the outward-facing peripheral contact regions, the bars constraining the interposer and adjacent ICs into a closely-spaced stack and providing common signal paths from the stacked ICs.

- 12 19. The assembly of claim 18 wherein the conductive bars end on one side at a plane away from one end of the stacked ICs, and are connected to an intermediary board having traces and third contact pads for connecting the IC stack to a printed circuit board (PCB).

20. The assembly of claim 18, wherein the ICs are memory chips and the PCB is a memory board.

- 18 21. The IC package of claim 7, further comprising a polymer material imposed between consecutive ICs and the interposer, the polymer material providing additional support for the stack and the conductive columns.